National Aeronautics and Space Administration

Aerospace Engineer

Steve Smith

Aerospace Research Engineer

NASA Ames Research Center

I do aerodynamic performance prediction and design of subsonic transports. I have spent about one third of my time doing experimental research in wind tunnels, and about two thirds in computational research, applying computer flow simulations to evaluate new airplane concepts, or develop more refined theories. I have studied advanced design concepts like the "oblique wing" and the "joined wing," done design optimization on winglets, and studied an unusual flow control device called a "vortilon". My most interesting project in the last few years has been to help design an airplane to fly on Mars. The airplane is called ARES, and you can learn more about it at http://marsairplane.larc.nasa.gov. I am also working on a rocket booster design that deploys wings after stage separation and glides back to the launch site.

Areas of expertise:

- Aerodynamic performance prediction

How I first became interested in this profession:

My father is an aeronautical engineer, so I was exposed to the kinds of things he worked on even when I was little. I can remember being two or three years old, and my bedtime reading was usually browsing through Aviation Week magazine. My coloring books had pictures of airplanes. I started building and flying model airplanes when I was about 8 years old.

What helped prepare me for this job:

I grew up with a deep love of nature, spending hours watching and drawing birds. I was good in math but I really liked biology too. In high school, I had a great teacher for both chemistry and physics, and from these classes I saw how I could turn my fun with airplanes into a fun career.

My education and training:

- BS, University of California, Davis
- PhD, Stanford Univeristy

My career path:

I came to Ames Research Center straight out of college, and started working on a wind tunnel project using miniature jet engines in a model of a jet fighter. After that project, I went to Stanford University for a year to get a Master's degree. When I came back to Ames, I worked on the joined wing project.

What I like about my job:

Whatever the goal of the research is, it always breaks down into many smaller tasks, so the variety keeps work from getting boring. Our most important task is publishing the results. It doesn't do anyone any good to spend time and money to do research if the results are not published so everyone can use them. Most engineers and scientists are not trained to be good writers, so publishing is often the hardest part, but it's also the most satisfying part. When a report is finished and distributed, and other researchers and designers learn from your work to make their designs better, that's fantastic.

What I don't like about my job:

Just like any other job, not everything is fun. To do a project, you must explain to managers why it's important and how it will improve technology. There are other good ideas that deserve funding also, so sometimes there isn't enough money or wind tunnel time to do something. Sometimes managers don't recognize the potential benefits, and often designers would like to keep doing things "the old way" so they don't pay attention to your ideas. And of course, just like Dilbert's job, there are too many meetings.

My advice to anyone interested in this occupation:

The history of science and math is not taught very much in school. I think it's important to understand how it is that we know what we know. How did scholars approach science before Galileo's time, and after? When did scientists start to understand the flow characteristics around wings, or in fluid boundary layers. How did mathematicians invent calculus? I think every engineer should know more about the "cultural heritage of engineering."